

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE AS
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Applicant: Loctite Corporation
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Authorized Officer: Katherine A. Bareford
Attorney's Docket: 500-68 PCT
Title: MOBILE VESSEL METHOD AND SYSTEM FOR
IMPREGNATING POROUS ARTICLES
Date: September 21, 2000

EXPRESS MAIL CERTIFICATE

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Assistant Commissioner for Patents
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REPLY TO WRITTEN OPINION UNDER RULE 66.3

Madam:

In reply to the Written Opinion mailed on 21 July 2000 in the above-identified application, a reply to which is due 21 September 2000, Applicant respectfully requests consideration of the enclosed Response to the Written Opinion under Rule 66.

Applicant acknowledges the Authorized Officer's indication regarding claims 5-8, 11-17, 23, 24, 26, 28-30, 32, 34-41 as meeting the criteria for novelty set out in PCT Article

33(2). Applicant further acknowledges the Authorized Officer's indication regarding claims 1-41 as meeting the criteria for industrial applicability set out in PCT Article 33(4).

Further, in the attached substitute pages, claims 1, 9, 18 and 33 are amended to more clearly identify the invention, as incorporated in the following amendments:

1. An impregnation process, comprising the steps of:
 - a.) providing at least one mobile vessel in which impregnation of a porous article can be carried out, said vessel comprising a chamber for containing a flowable impregnating composition and at least one porous article to be impregnated;
 - b.) providing a series of stations defining [an] a selection of impregnation [sequence] sequences, each of said stations to perform at least one specific impregnation step on said at least one porous article within said at least one vessel;
 - c.) sequentially directing said at least one vessel to at least one selected station chosen from said series of stations; and
 - d.) performing said at least one specific impregnation step at said at least one selected station.

9. An impregnation process, comprising the steps of:
 - a.) providing at least one mobile vessel containing a flowable impregnating composition and at least one porous article to be impregnated;
 - b.) providing a series of stations defining [an] a selection of impregnation [sequence] sequences, each of said stations to perform at least one specific impregnation step on said at least one porous article within said at least one vessel;
 - c.) sequentially directing said at least one vessel to at least one selected station chosen from said series of stations;
 - d.) performing said at least one specific impregnation step at said at least one selected station; and
 - e.) repeating steps c.) and d.) until said at least one porous article is impregnated with said flowable impregnating composition.

18. A system for impregnating porous articles comprising:

- (a) a series of stations defining [an] a selection of impregnated [sequence] sequences wherein each of said stations performs at lease one specific impregnation step for impregnating one or more porous articles;
- (b) at least one mobile vessel for retaining a flowable impregnating composition and said one or more porous articles to be impregnated, for transporting said composition and said at least one article to said series of stations and for providing a closed environment for conducting said impregnation steps; and
- (c) means for directing said vessel sequentially to said series of stations.

33. A system for impregnating porous articles, comprising:

- a series of stations defining [an] a selection of [impregnated sequence] impregnation sequences wherein each of said stations performs at lease one specific impregnation step for impregnating one or more porous articles;
- at least one mobile vessel for retaining a flowable impregnating composition and said one or more porous articles to be impregnated, wherein said flowable impregnating composition requires de-aeration prior to use; said vessel being adapted to transport said composition and said at least one porous article to said series of stations; and being adapted to provide a closed environment for conducting said impregnation step;
- means for directing said vessel sequentially to said series of stations; and
- means for de-aerating said flowable impregnating composition.

REMARKS

As is apparent, independent claims 1, 9, 18 and 33 have been amended to further clarify subject matter which applicant regards as the invention. It is submitted that none of the amendments constitutes new matter under Rule 70.2(c). In view of these amendments and the remarks below, reconsideration is respectfully requested.

1. Novelty Under PCT Article 33(2)

The Authorized Officer has indicated that claims 1-4, 9-10, 18-22, 25, 27, 31 and 33 lack novelty under PCT Article 33(2) as being anticipated by U.S. Patent No. 5,022,343 to Fujikawa et al. ("Fujikawa"). In particular, the Authorized Officer states:

Fujikawa teaches an impregnation process. Column 1, lines 5-15. At least one mobile vessel in which impregnation of a porous article can be carried out is provided. Column 8, lines 5-30 and column 10, lines 10-50. The vessel comprises a chamber for containing a flowable impregnating composition and at least one porous article to be impregnated. Column 8, lines 50-65 and column 12, lines 5-20. A series of stations defining an impregnation sequence is provided. Column 7, lines 5-40. Each of the stations performs at least one specific impregnation step. Column 12, lines 5-60. The vessel is sequentially directed to at least one selected station chosen from the series of stations. Column 12, lines 5-60. At least one specific impregnation step is performed at the selected station. Column 12, lines 5-60.

As disclosed in the written description and particularly set forth in independent claims 1 and 9, the present invention is directed to an impregnation process wherein at least one mobile vessel defining a chamber therein transports a flowable impregnating composition and at least one porous article to be impregnated. Each vessel is sequentially, and may be repeatedly, directed to a series of stations wherein at least one specific impregnating step is performed at each station. The series of stations define a selection of impregnation sequences, such that a user may select a desired sequence and direct the vessel to the appropriate station. Independent claims 18 and 33 claim a corresponding system wherein the present impregnating process is effected.

Fujikawa discloses an impregnating carbonizing apparatus having exactly two stations for performing an impregnating step, namely, a reduced pressure impregnating station and a high pressure impregnating carbonizing station. A specimen case is adapted that is particularly applied in succession to each of the reduced pressure station and the high pressure station. The case receives a porous article and a block of impregnant therein such that the impregnant becomes flowable upon the application of heat to the case. The case is transported via crane or similar device first to the reduced pressure impregnating station where gas in the case is discharged and the case is heated externally under reduced pressure

to induce penetration of the impregnant into pores of the porous article. The case is thereafter transported to the high pressure impregnating carbonizing station where each of a pressurizing impregnating step and a carbonizing baking step are performed for further porous penetration by the impregnant.

Contrary to the Examiner's statement, Fujikawa does not anticipate the present invention. Specifically, Fujikawa does not explicitly or implicitly show a selection of impregnation sequences wherein the user can determine how many stations are required and to which stations a mobile vessel should be directed. Fujikawa provides only two specific impregnation stations and determines the precise sequence in which an impregnation step must be performed at each of the two stations. Deviation from this sequence is not permitted, as evidenced by the text of Fujikawa itself:

With this process, the reduced pressure impregnating step, impregnating step and carbonizing baking step are performed successively in this order, and the reduced pressure impregnating step is carried out at the reduced pressure impregnating station, and the other two steps are carried out at the pressurizing impregnating and carbonizing station.

Fujikawa, col. 5, lines 55-61.

In the present invention, sequential direction of the vessels may vary with the selection of the impregnation sequence, enabling freedom to direct the vessel to as few or as many stations as desired. The user can thereby elect to execute an entire impregnation process or merely portions thereof, depending upon the needs of the manufacturer. The present invention recognizes the availability of unique impregnation processes in the industry, such as wet vacuum, wet vacuum/pressure and dry vacuum/pressure processes and the like. The present invention as claimed therefore enables selection of the impregnation steps that are required to complete the requisite process and does not limit direction of a mobile vessel to only one specific sequence.

Similarly, Fujikawa does not anticipate a system for impregnating porous articles as claimed in either of claim 18 or 33. In particular, Fujikawa does not provide a system for impregnating porous articles wherein a series of stations defines a selection of impregnation

sequences. Unlike the present invention, the apparatus of Fujikawa merely provides two stations that must be used in a particular sequence to achieve its intended results. Fujikawa allows no deviation from the order of impregnation steps and cannot therefore permit selection of the direction of a mobile impregnation vessel within a variety of impregnation sequences as presently claimed.

In summary, since Fujikawa fails to disclose each and every element of claim 1 or 9 of the subject application, Fujikawa does not anticipate claims 1 and 9 and claims dependent thereon. Similarly, since Fujikawa does not disclose each and every element of claim 18 or 33 of the subject application, Fujikawa does not anticipate claims 18 and 33 and claims dependent thereon. Therefore, the Applicant respectfully submits that the claims of the present application are novel over Fujikawa.

2. Obviousness Under PCT Article 33(3)

The Authorized Officer has further indicated that claims 5-7, 11-17, 23, 26, 28-30, 32 and 33-41 lack an inventive step under PCT Article 33(3) as being obvious over Fujikawa in view of U.S. Patent No. 4,520,045 to Kutsuna et al. ("Kutsuna").

The Authorized Officer specifically states:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fujikawa to use the materials, reclaiming and deaerating of Kutsuna with an expectation of similar beneficial results, given that Fujikawa teaches an impregnating method with a vessel, an applied vacuum and applied pressure and Kutsuna teaches materials, reclaiming and deaerating techniques conventionally used in such process. It would have been further obvious to tip the vessel to retrieve the maximum excess material so that that all the material could exit the vessel. It would further have been obvious that the deaeration vessel could be independent of the storage tank as desired, as long as a vacuum was applied on the material before it entered the process vessel.

Written Opinion, July 21, 2000, Sheet 10. Para. 4 (emphasis added).

As claimed herein and further described in the specification, the present invention provides a number of advantages over conventional impregnation processes. For example, an increase in the number of porous articles that can be impregnated simultaneously is realized because such articles can be directed to the appropriate impregnation station. Such articles do not require direction through an entire impregnation system. Some articles are retained in vessels that are directed through all impregnation steps in an impregnation process, the order of which steps may be altered depending upon the desired characteristics of the final impregnated article. Other articles and vessels may alternatively be directed only to a vacuum station, while still others are directed only to a pressurizing station or to a centrifuging station. The present invention therefore provides the user with the unique ability to select and define any sequence of stations for one or more vessels, and further allows for such sequencing to occur simultaneously. The selection of stations will be implemented in a given impregnation sequence, thereby defining a number of impregnation sequences from which one or more selections can be made. Neither Fujikawa nor Kutsuna even remotely disclose, teach or suggest such a feature.

Applicant respectfully reiterates the discussion of Fujikawa presented hereinabove and adds that Kutsuna discloses a method for impregnating a die cast object with a sealant wherein a sealant storage vessel containing a predetermined amount of a flowable sealant therein is in fluid communication with an impregnation vessel. A channel interconnecting the two vessels establishes fluid communication wherein the channel has a valve integrated therewith. The pressure of each vessel is adjusted to substantially the same level so as to obviate the incorporation of air into the sealant. The sealant then flows from the storage vessel to the impregnation vessel, in which at least one die cast article resides. After impregnation, the sealant re-enters the storage vessel and pressure is applied to the articles so as to remove excess sealant therefrom.

Claims 5, 6 and 7 of the present invention provide the step of reclaiming of a flowable impregnation composition effected at a retrieval station for the reclaiming, and at which a tipping step occurs for pouring the composition. Each of these claims depend on claim 1, which includes a series of stations defining a selection of impregnation sequences. Not only does Fujikawa fail to teach or suggest this feature of the invention, but Kutsuna also fails to

remedy this deficiency in Fujikawa. Kutsuna does not teach an impregnation process or system in which at least one mobile vessel can be directed to a series of stations to effect one of a selection of impregnation sequences. By the Authorized Officer's own admission, Kutsuna teaches "conventional" reclaiming and deaerating techniques that are achieved via fixation of impregnation and sealant storage vessels. Contrary to the Authorized Officer's allegations, such techniques teach away from the present invention.

In addition, claims 11-17, 23, 26, 28-30 and 32 each depend from a claim that provides a series of stations defining a selection of impregnation sequences. Kutsuna again fails to remedy the deficiency in Fujikawa, instead focusing on conventional reclaiming and deaeration techniques that teach away from the present invention. The combination Fujikawa with Kutsuna, therefore, cannot be said to disclose, teach or suggest the subject matter of these claims.

With respect to independent claim 36 and claims 37-41 dependent thereon, claim 36 provides an impregnation system that includes at least one de-aeration vessel or containing a flowable impregnation composition to which a negative pressure is applied for the removal of air from the composition. The system further includes at least one impregnation vessel in which impregnation of a porous article carried thereby is effected. The de-aeration vessel remains independent of each of a de-aeration vessel and the impregnation vessel so as to maintain selective, rather than compulsory, use thereof in an impregnation process.

Unlike the present invention, Kutsuna does not teach or suggest, either alone or in combination with Fujikawa, a de-aeration vessel that remains independent of each of a flowable impregnant storage tank and impregnation or process vessel. Kutsuna specifically requires fluid communication between a sealant storage vessel and an impregnation vessel that is effected by an interconnecting conduit, a feature that is obviated by the present invention. Although the Authorized Officer concludes that it would have been obvious "that the deaeration vessel could be independent of the storage tank as desired" (Written Opinion, Sheet 10, Supplemental Box, para. 4, lines 6-7), the Authorized Officer finds no support in either of Fujikawa or Kutsuna for this conclusion. Applicant therefore submits that claim 36

and claims directly or indirectly depending therefrom are thus not rendered obvious by Fujikawa either alone or in combination with Kutsuna.

The Authorized Officer has also indicated that claims 8 and 24 lack an inventive step under PCT Article 33(3) as being obvious over Fujikawa in view of Kutsuna and further in view of U.S. Patent No. 4,311,735 to Young ("Young").

The Authorized Officer specifically states:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fujikawa in view of Kutsuna to use the centrifuge of Young with an expectation of similar beneficial results, given that Fujikawa in view of Kutsuna teaches a[n] impregnating method with a vessel, an applied vacuum and applied pressure, and Young teaches rotating techniques in such a process to improve impregnation results.

Written Opinion, July 21, 2000, Sheet 11, para. 1.

Applicant respectfully reiterates the discussion of Fujikawa and Kutsuna presented hereinabove and adds that Young fails to provide any teaching that would remedy the deficiencies of these references as previously discussed. Young discloses a method for impregnating a porous article wherein the article is placed within a vessel that is thereafter evacuated so as to draw air from pores in the article. The vacuum is released with the pores immersed in a liquid impregnant in the vessel. Excess impregnant is then removed from the vessel, and the article is washed with a fluid supplied to the vessel to further remove excess impregnant from the article. The washing fluid is thereafter removed and the article is heated within the vessel to effect curing of the pregnant within the pores. The impregnated article is finally removed from the vessel. The article is rotated during at least a portion of the impregnation treatment.

Young has been cited for its alleged teaching of rotation of a porous article during impregnation. Young, however, discloses typical impregnation steps that suffer from the same limitations of Fujikawa and Kutsuna, namely an impregnation process comprising steps that are fixed, inflexible and predetermined by the system in which they are employed. Young adds nothing of any relevance to conventional fixed sequencing as taught in each of

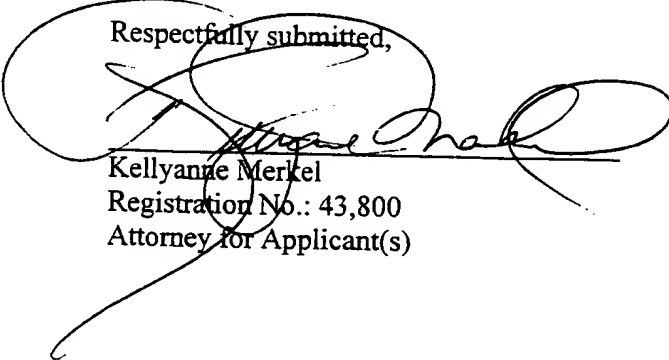
Fujikawa and Kutsuna. Thus, the combination of Fujikawa in view of Kutsuna and Young fails to teach or suggest the subject matter of claims 8 and 24. Claims 8 and 24, therefore, do not lack inventive step and are patentably distinct in view of these references.

In consideration of Fujikawa's deviations from the present invention and the further distinctions imposed by Kutsuna and Young, it is evident that the combination of these references would not produce the present invention. One skilled in the art, reading these references as for the entirety of their teachings, would not derive a method and system that provides a series of stations (i) defining a selection of impregnation sequences and (ii) sequentially directing a mobile vessel to appropriate stations within a selected sequence. The present combination of elements permits selective "delivery" of a mobile vessel to a desired impregnation station so as to effect only those impregnation steps on a porous article as are required. Multiple vessels may thereby be simultaneously directed to a plurality of different impregnation stations to efficiently perform a variety of impregnation steps on any number of porous articles.

The Applicants respectfully submit that Fujikawa, Kutsuna or Young, either considered alone or in combination, fail to teach or suggest Applicant's invention as a whole, and, in particular, the combination of a series of stations that define a selection of impregnation sequences wherein each station performs at least one specific impregnation step.

Should the Examiner have any questions regarding this response or wish to discuss this matter in further detail, please contact the undersigned attorney.

Respectfully submitted,



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WHAT IS CLAIMED IS:

1. An impregnation process, comprising the steps of:
 - a.) providing at least one mobile vessel in which impregnation of a porous article can be carried out, said vessel comprising a chamber for containing a flowable impregnating composition and at least one porous article to be impregnated;
 - b.) providing a series of stations defining a selection of impregnation sequences, each of said stations to perform at least one specific impregnation step on said at least one porous article within said at least one vessel;
 - c.) sequentially directing said at least one vessel to at least one selected station chosen from said series of stations; and
 - d.) performing said at least one specific impregnation step at said at least one selected station.
2. The impregnation process of claim 1, wherein said series of stations includes a vacuum station where a vacuum step is performed on said vessel chamber to remove air from at least one porous article.
3. The impregnation process of claim 2, wherein said chamber to returned to ambient pressure to initiate impregnation of said porous article.
4. The impregnation process of claim 3, wherein said series of stations includes a pressure station where a pressurization step is performed on said at least one porous article to complete said impregnation of said porous article.
5. The impregnation process of claim 1, further comprising the step of reclaiming said flowable impregnating composition.
6. The impregnation process of claim 5, wherein said series of stations includes a flowable impregnating composition retrieval station where said reclaiming step is performed.
7. The impregnation process of claim 6, wherein said reclaiming step includes

tipping said at least one vessel horizontally so as to pour said impregnating composition therefrom.

8. The impregnation process of claim 1, wherein said series of stations includes a centrifuge station where a centrifuge step is performed on said at least one porous article to expel excess flowable impregnating composition from an exterior surface thereof.

9. An impregnation process, comprising the steps of:

- a.) providing at least one mobile vessel containing a flowable impregnating composition and at least one porous article to be impregnated;
- b.) providing a series of stations defining a selection of impregnation sequences, each of said stations to perform at least one specific impregnation step on said at least one porous article within said at least one vessel;
- c.) sequentially directing said at least one vessel to at least one selected station chosen from said series of stations;
- d.) performing said at least one specific impregnation step at said at least one selected station; and
- e.) repeating steps c.) and d.) until said at least one porous article is impregnated with said flowable impregnating composition.

10. The impregnation process of claim 9, wherein said flowable impregnating composition transitions from liquid to solid upon infiltrating a porosity of said porous article.

11. The impregnation process of claim 10, wherein said flowable impregnating composition is selected from the group of curing compositions consisting of anaerobic, heat, moisture, radiation and evaporation curing compositions.

12. The impregnation process of claim 9, further comprising the step of de-aerating said flowable impregnating composition prior to providing said flowable impregnating composition to said at least one vessel.

13. The impregnation process of claim 12, wherein said de-aeration step is executed in an independent de-aeration vessel.
14. The system according to claim 13, wherein said de-aeration vessel retains said flowable impregnant composition therein during application of a vacuum thereon to remove air from within said flowable impregnant composition.
15. The impregnation process of claim 9, further comprising the step of reclaiming said flowable impregnation composition.
16. The impregnation process of claim 15, wherein said series of stations includes a flowable impregnating composition retrieval station where said reclaiming step is performed.
17. The impregnating process of claim 16, wherein said reclaiming step includes tipping said at least one vessel horizontally so as to pour said flowable impregnating composition therefrom.
18. A system for impregnating porous articles comprising:
- (a) a series of stations defining a selection of impregnated sequences wherein each of said stations performs at least one specific impregnation step for impregnating one or more porous articles;
 - (b) at least one mobile vessel for retaining a flowable impregnating composition and said one or more porous articles to be impregnated, for transporting said composition and said at least one article to said series of stations and for providing a closed environment for conducting said impregnation steps; and
 - (c) means for directing said vessel sequentially to said series of stations.
19. The system according to claim 18, wherein said series of stations includes a vacuum station where a vacuum step is performed on said at least one porous article to

29. The system according to claim 28, wherein said de-aeration vessel retains said flowable impregnant composition therein during application of a vacuum thereon to remove dissolved air from within said flowable impregnant composition.
30. The system according to claim 18, wherein each of said stations comprises a plurality of processing positions for accommodating multiple vessels simultaneously.
31. The system according to claim 18, wherein said directing means includes a hoist, conveyor, rails, robot, human operator, forklift or other means for transporting said at least one mobile vessel to each of said stations.
32. The system according to claim 18, wherein said directing means includes a programmable logic controller, PC based controller or other means of executing machine logic.
33. A system for impregnating porous articles, comprising:
a series of stations defining a selection of impregnation sequences wherein each of said stations performs at least one specific impregnation step for impregnating one or more porous articles;
at least one mobile vessel for retaining a flowable impregnating composition and said one or more porous articles to be impregnated, wherein said flowable impregnating composition requires de-aeration prior to use; said vessel being adapted to transport said composition and said at least one porous article to said series of stations; and being adapted to provide a closed environment for conducting said impregnation step;
means for directing said vessel sequentially to said series of stations; and
means for de-aerating said flowable impregnating composition.
34. The system according to claim 33, wherein said de-aerating means includes a de-aeration vessel independent of a flowable impregnant storage tank and process vessel.